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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the device which performs serial infrared ray communication with the communication method which IrDA (Infrared Data Association) advocates especially using a serial infrared-ray-communication mechanism about a serial infrared ray communication unit.

[0002]

[Description of the Prior Art]In the former and this kind of serial infrared ray communication unit, A serial infrared-ray-communication mechanism (it is hereafter considered as Ir port), and an IrLAP (IrDA Link Access Protocol) layer, It has an IrLMP (IrDA Link Management Protocol) layer and upper layer software (it is hereafter considered as the upper layer), and serial infrared ray communication is performing communication with a mating device.

[0003]An IrLAP layer is regulation of the standardization which IrDA advocates, In order to secure the rapidity and reliability of infrared ray communication, it is a protocol layer which manages the communication procedure similar to HDLC (High Level Data Link Control Procedure: high-level data link control).

[0004]An IrLMP layer is the upper layer of an IrLAP layer, and in order to make connection with two or more devices, it is a protocol layer which manages characteristic-data service of a session or the partner who connects. It is for the upper layer performing communication with a mating device using the service which an IrLAP layer and an IrLMP layer provide.

[0005]The flow of the command from the upper layer in the communication procedure used with the above-mentioned IrDA serial infrared ray communication unit, data transmission, and an unlinking procedure are explained using drawing 9 - drawing 11.

[0006]The command judges a disconnect request and a data transmission request that an IrLMP layer receives the command from the upper layer (the drawing 9 step S42, S43). (drawing 9 step S41) If the command is judged to be a data transmission request, an IrLMP layer will assemble the send data showing the data transmission request (drawing 9 step S44), and will publish a data transmission request in an IrLAP layer (drawing 9 step S45).

[0007]An IrLAP layer stores the send data by a FIFO (First In First Out) method on a

memory, if a data transmission request is published from an IrLMP layer (drawing 9 step S46).

[0008]On the other hand, if it judges that the command from the upper layer of an IrLMP layer is not a disconnect request or a data transmission request, either, processing (other processings) according to the command will be performed (drawing 9 step S47).

[0009]If an IrLMP layer judges that the command from the upper layer is a disconnect request, it will assemble the send data showing the disconnect request (drawing 10 step S48), and will publish a data transmission request in an IrLAP layer (drawing 10 step S49).

[0010]An IrLAP layer stores the send data with a FIFO system on a memory, if a data transmission request is published from an IrLMP layer (drawing 10 step S50). After that, an IrLMP layer publishes a disconnect request to an IrLAP layer (drawing 10 step S51).

[0011]On the other hand, in an IrLAP layer, it judges whether there is any send data stored with the FIFO system on the memory (drawing 11 step S61), and if send data is on a memory, the send data of the head will be transmitted to a connection destination through Ir port (drawing 11 step S62).

[0012]An IrLAP layer's transmission of send data will judge whether RNR (Receive NotReady) was received or RR (Receive Ready) was received (the drawing 11 step S63, S64). Here, if RNR is received, an IrLAP layer judges that a connection destination was not able to receive send data, and it will resend send data until a connection destination receives send data (the drawing 11 step S62, S63).

[0013]If RR is received without receiving RNR, it judges that the IrLAP layer received send data, and a connection destination will take out the send data from the head of FIFO, and will clear it (drawing 11 step S65). An IrLAP layer will perform exception processing (processing of protocol violation) according to the received frame, if it receives except RNR and RR (drawing 11 step S66).

[0014]In the communication procedure used with the above-mentioned IrDA serial infrared ray communication unit, an example of normal operation until it performs cutting after the data transfer to the device B from the device A is shown in drawing 12.

[0015]In this case, if a Request to Send (1) is published from the upper layer of the device A, an IrLMP layer will publish Data.request (2) to an IrLAP layer. An IrLAP layer edits a data frame (3) with the data received from the IrLMP layer, and transmits to the device B.

[0016]If a data frame (3) is received, the IrLAP layer of the device B notifies Data.indication (31) to the IrLMP layer which is the upper layer, and in order to tell that the data frame (3) has been simultaneously received normally to the device A, it will answer with the RR frame (32). The IrLMP layer of the device B which received Data.indication (31) notifies reception (33) to the upper layer, and transmission of data completes it normally by the above sequence.

[0017]On the other hand, if a disconnect request (6) is published from the upper layer of the device A, an IrLMP layer will cut an IrLMP level with a mating device first. Since cutting of an IrLMP level is performed via a data frame, an IrLMP layer is publishing Data.request (7) to an IrLAP layer, and the data frame (33) which requires cutting of an IrLMP layer is transmitted.

[0018]The IrLAP layer of the device B will notify Data.indication (34) to an IrLMP layer, if a data frame is received. Since an IrLMP layer checks the contents of the data

and the contents show cutting of the IrLMP level, disconnect-request reception (35) is notified to the upper layer. Since the IrLAP layer received the data frame normally, it answers with the RR frame (11). Here, cutting of an IrLMP layer level is completed. [0019]Next, since cut treating of an IrLAP level is performed, Disconnect.request (36) is published in an IrLAP layer and, as for the IrLMP layer of the device A, the DISC (DISConnect) frame (37) is published by this from an IrLAP layer. The DISC frame is a frame which requires cutting of a circuit of a distant office.

[0020]The IrLAP layer of the device B notifies Disconnect.indication (38) to an IrLMP layer. Since the disconnect-request reception to the upper layer is notified by disconnect-request reception (35) at this time, the event of the notice to the upper layer is not generated.

[0021]Since the IrLAP layer received the DISC frame normally, it answers by the UA (Unnumbered Acknowledgement) frame (39), and cutting of an IrLAP level completes it now. Here, the UA frame is a frame for having accepted the demand and answering a distant office, when the demand about setting out in the modes, such as the above-mentioned DISC frame, is received.

[0022]

[Problem(s) to be Solved by the Invention]In the conventional serial infrared ray communication unit mentioned above. Since both the usual data transmission and cutting of the IrLMP level are performed by issue of Data.request and the contents of the data frame are not checked in an IrLAP layer, distinction of Data.request by which demand cannot be performed.

[0023]Since each class of the upper layer, an IrLMP layer, and an IrLAP layer does not have an interface which waits completion of transmitting processing and cut treating, when the upper layer and the IrLMP layer of the device A publish a disconnect request to a lower layer, respectively, they are recognized to be what transmitting processing completed.

[0024]For example, when cutting after performing data transfer to the device B from the device A, operation when the device B cannot receive data because of a receive buffer full state is shown in drawing 13.

[0025]. as the sequence of drawing 12 with the operation same in drawing 13 from the Request to Send (1) from the upper layer of the device A to data frame transmission (3) -- here, since the device B is a buffer full state, suppose that a data frame (3) was not able to be received. In order that the IrLAP layer of the device B may tell the device A about a busy state then, an RNR frame (4) is answered. The IrLAP layer of the device A which received the RNR frame resends a data frame (5).

[0026]In order that the upper layer of the device A may not have a means to get to know that the IrLAP layer is performing such a retransmitting process and may not wait completion of transmitting processing, it publishes a disconnect request (6) as what transmitting processing has completed.

[0027]Since an IrLMP layer does not know the retransmitting process of an IrLAP layer, either, Data.request (7) is published for the disconnect request of an IrLMP level. Since an IrLAP layer is during the retransmitting process of a data frame (5), transmission is kept waiting until a retransmitting process completes the data frame (41) which is a disconnect request of the IrLMP level received by Data.request (7).

[0028]Transmission can be kept waiting until similarly transmitting processing of a data

frame (5) and (41) completes the DISC frame (43) by Disconnect.indication (42) which is a disconnect request of an IrLMP level.

[0029]As mentioned above, a disconnect request recognizes it as what cut treating completed by the upper layer of the device A in order not to wait completion of processing. However, the device B has not received the disconnect request (41) of the IrLMP level in practice. That is, for the device B, a connected state has a link and the problem that recognition of the state of a link crosses between the device A and the device B occurs.

[0030]For example, when another device C requires connection of a link from the device B, since the device B has a link with the device A in a connected state, it can consider a possibility of refusing the connection request from the device C.

[0031]Then, it is in the purpose of this invention providing the serial infrared ray communication unit cancels the above-mentioned problem, can perform cut treating preferentially when a disconnect request is received during a retransmitting process, and recognition of a link connection state between devices can be prevented from crossing.

[0032]

[Means for Solving the Problem]A serial infrared ray communication unit by this invention is provided with the following.

An IrLAP layer which manages a communication procedure.

An IrLMP layer which sends out a data transmission request and a disconnect request to said IrLAP layer at least according to a demand from the upper layer.

It is a serial infrared ray communication unit containing a part which communicates send data to a connection destination generated based on said data transmission request and said disconnect request from said IrLMP layer to said connection destination with infrared rays. A discriminating means which distinguishes existence of a disconnect request from said upper layer in either said IrLAP layer and said IrLMP layer.

An abandonment means to discard untransmitted send data to said connection destination when said discriminating means distinguishes from those [said] with a disconnect request.

[0033]Other serial infrared ray communication units by this invention are provided with the following.

An IrLAP layer which manages a communication procedure.

An IrLMP layer which sends out a data transmission request and a disconnect request to said IrLAP layer at least according to a demand from the upper layer.

An accumulation means which is a serial infrared ray communication unit containing a part which communicates send data to a connection destination generated based on said data transmission request and said disconnect request from said IrLMP layer to said connection destination with infrared rays, and accumulates said send data.

A discriminating means which distinguishes whether a data transmission request from said IrLMP layer to said IrLAP layer is a disconnect request in said IrLMP layer level, An abandonment means to be accumulated in said accumulation means and to discard untransmitted send data to said connection destination when said discriminating means distinguishes from a disconnect request in said IrLMP layer level.

[0034]Another serial infrared ray communication unit by this invention is provided with

the following.

An IrLAP layer which manages a communication procedure.

An IrLMP layer which sends out a data transmission request and a disconnect request to said IrLAP layer at least according to a demand from the upper layer.

An accumulation means which is a serial infrared ray communication unit containing a port part which communicates send data to a connection destination generated based on said data transmission request and said disconnect request from said IrLMP layer to said connection destination with infrared rays, and accumulates said send data.

An issuing means which publishes [it being accumulated in said accumulation means, and discarding untransmitted send data to said connection destination, when a decision means which judges whether a demand from said upper layer is said disconnect request, and said decision means judge it as said disconnect request, and] an abandonment demand in said IrLAP layer.

[0035] Although it is necessary in an unlinking procedure to perform unlinking in two protocol layers, IrLAP and IrLMP, like the above in IrDA, In this invention, if there is untransmitted data when IrLAP receives a disconnect request of an IrLMP level, it has a function which discards it and over which priority is given to a disconnect request. By this, in the state where it is shown in drawing 13, since it becomes possible to complete unlinking processing promptly even if unlinking between the device A and the device B is behind, time for link connection between the device B and the device C to become possible can be shortened.

[0036] In this invention, if IrLAP has non-send data before IrLMP publishes a disconnect request in an IrLMP level, after requiring abandonment of the non-send data, a disconnect request of an IrLMP level is published, and it has a function over which priority is given to a disconnect request. By this, in the state where it is shown in drawing 13, since it becomes possible to complete unlinking processing promptly even if unlinking between the device A and the device B is behind, time for link connection between the device B and the device C to become possible can be shortened.

[0037]

[Embodiment of the Invention] Next, the example of this invention is described with reference to drawings. Drawing 1 is a block diagram showing the composition of one example of this invention. In a figure, the serial infrared-ray-communication machine 1 Upper layer software (it is hereafter considered as the upper layer) (not shown). It is constituted including the IrLMP control section 2 which processes an IrLMP layer, the IrLAP control section 3 which performs processing of an IrLAP layer, and the infrared ray communication section (serial infrared-ray-communication mechanism) 4.

[0038] The IrLAP control section 3 The demand receptionist part (it is hereafter considered as a demand receptionist part) 31 from IrLMP. It is constituted including the memory supervisor control part 32, the IrLMP level disconnect-request primary detecting element (it is hereafter considered as a disconnect-request primary detecting element) 33, the data conversion part 34, and the memory 35 containing FIFO (not shown).

[0039] Drawing 2 and drawing 3 are flow charts which show the communication procedure of one example of this invention. The flow of the command from the upper layer in the communication procedure of one example of this invention, data transmission, and an unlinking procedure are explained using these drawing 1 - drawing

3.

[0040]If the IrLMP control section 2 receives the command from the upper layer, the command will judge a disconnect request and a data transmission request. If the command is judged to be a data transmission request, the IrLMP control section 2 will assemble the send data showing a data transmission request, and will publish a data transmission request to the IrLAP control section 3.

[0041]On the other hand, if the IrLMP control section 2 judges that the command from the upper layer is not a disconnect request or a data transmission request, either, it will perform processing (other processings) according to the command. If the IrLMP control section 2 judges that the command from the upper layer is a disconnect request, it will assemble the send data showing the disconnect request, and will publish a data transmission request in an IrLAP layer.

[0042]It is judged that the IrLAP control section 3 receives the command from the IrLMP control section 2 in the demand receptionist part 31 whether the command is a data transmission request (drawing 2 step S2). (drawing 2 step S1) The demand receptionist part 31 will pass the disconnect-request primary detecting element 33 a data transmission request, if the command is judged to be a data transmission request. The disconnect-request primary detecting element 33 checks the contents of the data of a data transmission request (drawing 2 step S3), and distinguishes whether it is a disconnect request of an IrLMP level (drawing 2 step S4).

[0043]The memory supervisor control part 32 is performing storing of send data to FIFO of the memory 35, and management (surveillance is included) of drawing. If the command received in the demand receptionist part 31 is distinguished from the disconnect request of an IrLMP level in the disconnect-request primary detecting element 33, it will control to discard all the send data that is not transmitted [which were stored in FIFO] (drawing 2 step S5).

[0044]If the command received in the demand receptionist part 31 is not distinguished from the disconnect request of an IrLMP level in the disconnect-request primary detecting element 33, the memory supervisor control part 32, Or if it is distinguished from the disconnect request of an IrLMP level and all the send data that is not transmitted in FIFO is discarded, the send data is stored in FIFO of the memory 35 (drawing 2 step S6).

[0045]On the other hand, the IrLAP control section 3 will perform processing (other processings) according to the command, if the command from the IrLMP control section 2 received in the demand receptionist part 31 is not a data transmission request (drawing 2 step S7).

[0046]It is judged whether after the above-mentioned processing, the IrLAP control section 3 has send data stored in FIFO of the memory 35 (drawing 3 step S11). If FIFO has send data, after changing the send data of the head by the data conversion part 34, it transmits to a connection destination through the infrared ray communication section 4 (drawing 3 step S12).

[0047]It is judged whether the IrLAP control section 3 received whether RNR was received and RR, when send data was transmitted (the drawing 3 step S13, S14). Here, if RNR is received, the IrLAP control section 3 judges that a connection destination was not able to receive send data, and it will resend send data until a connection destination receives send data (the drawing 3 step S12, S13).

[0048]If RR is received without receiving RNR, the IrLAP control section 3 judges that send data was received, and a connection destination will take out the send data from the head of FIFO, and will clear it (drawing 3 step S15). The IrLAP control section 3 will perform exception processing (processing of protocol violation) according to the received frame, if it receives except RNR and RR (drawing 3 step S16).

[0049]Drawing 4 is a sequence chart which shows the example of the function over which priority is given to the disconnect request by one example of this invention of operation. Operation of the function over which priority is given to the disconnect request by one example of this invention using these drawing 1 and drawing 4 is explained.

[0050]The outline of operation of the data transmission in the communication procedure shown in drawing 4 is the same as that of the operation shown in drawing 13. When a Request to Send (1) is published from the upper layer of the device A, the device B cannot receive data by a receive buffer full state, but the disconnect request (6) is published for the IrLAP control section 3 of the device A from the upper layer during execution in resending (5) of the transmitting data frame. The device A and B of each shall comprise each part shown in drawing 1.

[0051]The IrLMP control section 2 publishes Data.request (7), in order to publish the disconnect request of an IrLMP level, if a disconnect request (6) is published from the upper layer. Here, the IrLAP control section 3 checks the contents of data in the disconnect-request primary detecting element 33, when a Data.request demand is received in the demand receptionist part 31, and it operates so that it may distinguish whether it is a disconnect request of an IrLMP level.

[0052]In this case, since Data.request (7) received in the demand receptionist part 31 is a disconnect request of an IrLMP level, the memory supervisor control part 32 of the IrLAP control section 3 discards the data frame (5) under resending. It becomes possible to transmit the data frame (8) which is a disconnect request of an IrLMP level by this. Here, if the receive buffer full state of the device B is canceled, the data which will be received next will be a disconnect request (8) of an IrLMP level. The IrLAP control section 3 of the device B notifies Data.indication (9) to the IrLMP control section 2, the contents of data are checked by the IrLMP control section 2, and since the contents are cutting of an IrLMP level, disconnect-request reception (10) is notified to the upper layer. [0053]Then, if Disconnect.request (12) which is a disconnect request of an IrLAP level is published from the IrLMP control section 2 by the side of the device A, The DISC frame (13) is transmitted from the IrLAP control section 3, and cut treating is completed by the response of the UA frame (15) from the device B.

[0054]By the above operation, it can become possible to process preferentially transmission of disconnect-request transmission (8) of an IrLMP level, the device B can bring forward the timing which recognizes an unlinking state, and the inconsistency of recognition of the link condition between the devices A and B can be avoided.

[0055]Drawing 5 is a block diagram showing the composition of other examples of this invention. In the figure, the serial infrared-ray-communication machine 5 is constituted including the upper layer (not shown), the IrLMP control section 6, the IrLAP control section 7, and the infrared ray communication section 4.

[0056]The IrLMP control section 6 is constituted including the disconnect-request primary detecting element 61 and the non-send data abandonment demand issuing part 62, and the IrLAP control section 7 The demand receptionist part (it is hereafter

considered as a demand receptionist part 71 from IrLMP, It is constituted including the memory supervisor control part 72, the data conversion part 73, and the memory 74 containing FIFO (not shown).

[0057]Drawing 6 and drawing 7 are flow charts which show the communication procedure of other examples of this invention. The flow of the command from the upper layer in the communication procedure of other examples of this invention, data transmission, and an unlinking procedure are explained using these drawing 5 - drawing 7.

[0058]The command judges a disconnect request and a data transmission request that the IrLMP control section 6 receives the command from the upper layer (the drawing 6 step S22, S23). (drawing 6 step S21) If the command is judged to be a data transmission request, the IrLMP control section 6 will assemble the send data showing the data transmission request (drawing 6 step S24), and will publish a data transmission request to the IrLAP control section 7 (drawing 6 step S25).

[0059]The IrLAP control section 7 stores the send data in FIFO of the memory 74 by the memory supervisor control part 72, if the data transmission request from the IrLMP control section 6 is received in the demand receptionist part 71 (drawing 6 step S26).

[0060]On the other hand, if the IrLMP control section 6 judges that the command from the upper layer is not a disconnect request or a data transmission request, either, it will perform processing (other processings) according to the command (drawing 6 step S27).

[0061]The IrLMP control section 6 will publish a non-send data abandonment demand from the non-send data abandonment demand issuing part 62 to the IrLAP control section 7, if it detects that the command from the upper layer is a disconnect request in the disconnect-request primary detecting element 61 (drawing 7 step S28). After that, the IrLMP control section 6 assembles the send data showing the disconnect request (drawing 7 step S29), and publishes a data transmission request to the IrLAP control section 7 (drawing 7 step S30). The IrLMP control section 6 publishes a disconnect request to the IrLAP control section 7 next (drawing 7 step S31).

[0062]Therefore, in the IrLAP control section 7, if the non-send data abandonment demand from the non-send data abandonment demand issuing part 62 is received in the demand receptionist part 71, the non-send data in FIFO of the memory 74 will be discarded by the memory supervisor control part 72.

[0063]After that, in the IrLAP control section 7, if the data transmission request from the IrLMP control section 6 is received in the demand receptionist part 71, the send data is stored in FIFO of the memory 74. Since the procedure of the data transmission by the IrLAP control section 7 is the same as that of one example of this invention, the explanation is omitted.

[0064]Drawing 8 is a sequence chart which shows the example of the function over which priority is given to the disconnect request by other examples of this invention of operation. Operation of the function over which priority is given to the disconnect request by other examples of this invention using these drawing 5 and drawing 8 is explained.

[0065]The outline of operation of the data transmission in the communication procedure shown in drawing 8 is the same as that of the operation shown in drawing 4 and drawing 13. When a Request to Send (1) is published from the upper layer of the device A, the device B cannot receive data by a receive buffer full state, but the disconnect request (6) from the upper layer is published for the IrLAP control section 7 of the device A during

execution in resending (5) of the transmitting data frame. The device A and B of each shall comprise each part shown in drawing 5.

[0066]The IrLMP control section 6 which received the disconnect request (6) requires abandonment (21) of non-send data from the IrLAP control section 7. If the IrLAP control section 7 has non-send data in FIFO of the memory 74 when the abandonment demand of the non-send data is received in the demand receptionist part 71, it will operate so that non-send data may be discarded by the memory supervisor control part 72. Here, the data frame (5) under resending is discarded.

[0067]The IrLMP control section 6 publishes Data.request (7) which is a disconnect request of an IrLMP level after this processing. Since the resending data frame (5) is already discarded at this time, the IrLAP control section 7 can transmit immediately the data frame (8) which is a disconnect request of an IrLMP level. The processing from transmission of this data frame (8) to the completion of IrLAP level cutting is the same as that of drawing 4.

[0068]By the above operation, since it becomes possible to process preferentially transmission of disconnect-request transmission (8) of an IrLMP level, the timing the device B recognizes an unlinking state to be can be brought forward, and the inconsistency of recognition of the link condition between the devices A and B can be avoided.

[0069]Thus, by discarding the send data which is not transmitted [which was stored in FIFO of the memory 35 when the data transmission request from the IrLMP control section 2 to the IrLAP control section 3 was distinguished from the disconnect request in an IrLMP layer level in the disconnect-request primary detecting element 33] by control of the memory supervisor control part 32, When a disconnect request is received during a retransmitting process, cut treating can be performed preferentially, and recognition of a link connection state between the devices A and B can be prevented from crossing.

[0070]By publishing a non-send data abandonment demand from the non-send data abandonment demand issuing part 62 to the IrLAP control section 7, when the disconnect-request primary detecting element 61 detects that the command from the upper layer is a disconnect request, When a disconnect request is received during a retransmitting process, cut treating can be performed preferentially, and recognition of a link connection state between the devices A and B can be prevented from crossing.

[0071]

[Effect of the Invention]By discarding untransmitted send data to a connection destination, when it distinguishes that the data transmission request from an IrLMP layer to an IrLAP layer is a disconnect request in an IrLMP layer level according to the serial infrared ray communication unit of this invention, as explained above, When a disconnect request is received during a retransmitting process, cut treating can be performed preferentially, and it is effective in the ability to prevent recognition of a link connection state between devices from crossing.

[0072]By according to other serial infrared ray communication units of this invention, discarding untransmitted send data to a connection destination, when it judges that the demand from the upper layer is a disconnect request, and publishing an abandonment demand in an IrLAP layer, When a disconnect request is received during a retransmitting process, cut treating can be performed preferentially, and it is effective in the ability to prevent recognition of a link connection state between devices from crossing.

[Translation done.]

TECHNICAL FIELD

[Field of the Invention] This invention relates to the device which performs serial infrared ray communication with the communication method which IrDA (Infrared Data Association) advocates especially using a serial infrared-ray-communication mechanism about a serial infrared ray communication unit.

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] An IrLAP layer which manages a communication procedure, comprising, An IrLMP layer which sends out a data transmission request and a disconnect request to said IrLAP layer at least according to a demand from the upper layer, A serial infrared ray communication unit containing a port part which communicates send data to a connection destination generated based on said data transmission request and said disconnect request from said IrLMP layer to said connection destination with infrared rays.

A discriminating means which distinguishes existence of a disconnect request from said upper layer in either said IrLAP layer and said IrLMP layer.

An abandonment means to discard untransmitted send data to said connection destination when said discriminating means distinguishes from those [said] with a disconnect request.

[Claim 2] An IrLAP layer which manages a communication procedure, comprising, An IrLMP layer which sends out a data transmission request and a disconnect request to said IrLAP layer at least according to a demand from the upper layer, A serial infrared ray communication unit containing a port part which communicates send data to a connection

destination generated based on said data transmission request and said disconnect request from said IrLMP layer to said connection destination with infrared rays.

An accumulation means which accumulates said send data.

A discriminating means which distinguishes whether a data transmission request from said IrLMP layer to said IrLAP layer is a disconnect request in said IrLMP layer level.

An abandonment means to be accumulated in said accumulation means and to discard untransmitted send data to said connection destination when said discriminating means distinguishes from a disconnect request in said IrLMP layer level.

[Claim 3]The serial infrared ray communication unit according to claim 2 by which said accumulation means, said discriminating means, and said abandonment means being included in said IrLAP layer.

[Claim 4]An IrLAP layer which manages a communication procedure, comprising, An IrLMP layer which sends out a data transmission request and a disconnect request to said IrLAP layer at least according to a demand from the upper layer, A serial infrared ray communication unit containing a port part which communicates send data to a connection destination generated based on said data transmission request and said disconnect request from said IrLMP layer to said connection destination with infrared rays.

An accumulation means which accumulates said send data.

A decision means which judges whether a demand from said upper layer is said disconnect request.

An issuing means which publishes [it being accumulated in said accumulation means, and discarding untransmitted send data to said connection destination, when said decision means judges it as said disconnect request, and] an abandonment demand in said IrLAP layer.

[Claim 5]The serial infrared ray communication unit according to claim 4 including said accumulation means in said IrLAP layer, and including said decision means and said issuing means in said IrLMP layer.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a block diagram showing the composition of one example of this invention.

[Drawing 2]It is a flow chart which shows the communication procedure of one example of this invention.

[Drawing 3]It is a flow chart which shows the communication procedure of one example of this invention.

[Drawing 4]It is a sequence chart which shows the example of the function over which priority is given to the disconnect request by one example of this invention of operation.

[Drawing 5] It is a block diagram showing the composition of other examples of this invention.

[Drawing 6] It is a flow chart which shows the communication procedure of other examples of this invention.

[Drawing 7] It is a flow chart which shows the communication procedure of other examples of this invention.

[Drawing 8] It is a sequence chart which shows the example of the function over which priority is given to the disconnect request by other examples of this invention of operation.

[Drawing 9] It is a flow chart which shows the communication procedure of a conventional example.

[Drawing 10] It is a flow chart which shows the communication procedure of a conventional example.

[Drawing 11] It is a flow chart which shows the communication procedure of a conventional example.

[Drawing 12] It is a sequence chart which shows an example of the normal operation of the data transmission in a conventional example, and unlinking processing.

[Drawing 13] It is a sequence chart which shows the data transmission in the receive buffer full state in a conventional example, and an example of operation of unlinking processing.

[Description of Notations]

1 and 5 Serial infrared-ray-communication machine

2, 6 IrLMP control section

3, 7 IrLAP control section

4 Infrared ray communication section

31, the demand receptionist part from 71 IrLMP

32 and 72 Memory supervisor control part

33 IrLMP level disconnect-request primary detecting element

34, 73 data conversion parts

35 and 74 Memory

61 Disconnect-request primary detecting element

62 Non-send data abandonment demand issuing part

[Translation done.]